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Scott Tomashefsky
California Energy Commission
1516 Ninth Street
Sacramento, California 95814

Dear Mr. Tomashefsky:

Pursuant to the direction set forth in your E-mail message of November 18, 1999, please find attached the comments of the Sacramento Municipal Utility District ("SMUD") related to the "Questions for the Siting Committee Workshop on Interconnection Rules."

Thank you for your attention to this matter.

Sincerely,

Jeffery D. Harris

Ellison & Schneider
Attorneys for the Sacramento Municipal
Utility District

QUESTIONS FOR THE SITING COMMITTEE WORKSHOP ON INTERCONNECTION RULES

The answers of the Sacramento Municipal Utility District ("SMUD") to the questions presented for the CEC Siting Committee workshop on interconnection rules are set forth in italics below.

I. Scope of technologies to be considered for standard interconnection rules

A. What size range of generating technologies should be applicable to the interconnection rules being considered in this proceeding? *SMUD proposes that generation sources from 1kW to 9.99MW be considered. The lower threshold of 1kW is chosen because rooftop PVs are commonly available in this size. The upper limit of 9.99MW is selected because in many instances the ISO has operational jurisdiction over units 10MW and larger. Units of this size are typically interconnected to transmission systems. These transmission interconnections necessitate extensive engineering studies and do not tend towards standard interconnection requirements.*

B. Should interconnection rules differ based on size range and technology? If so, how? *Yes. Interconnection issues for DG technologies with no rotational inertia (such as the inverters used in PV, Fuel Cells, some Micro Turbines, and DC storage systems) are fundamentally different than those technologies with rotational inertia (such as synchronous and induction machines). Specifically, machines with rotational inertial have a potential to produce energy during their spin down period, while inverter type DG's shut off virtually instantaneously. Because of these differences, interconnection requirements for inverter type DG technologies (having no rotational inertia) are less complex than technologies with rotational inertia. Further DG size is a significant issue when considering islanding and system stability. DG units that are much smaller than a distribution feeder's load will typically pose little threat to stability and less rigorous interconnection requirements may therefore be justified.*

C. Should electricity storage technologies be considered also? If so, what types should be considered? *Yes. Storage systems that deliver energy through an interconnection with the distribution system should be treated similarly to other, non-storage DG technologies. For example, as DC storage systems typically utilize an inverter, the DG interconnection requirements for that type of inverter should be applicable.*

D. Should the standards be independent of the mode of operation? In other words, should the same standards apply whether the intended function is for emergency or back-up use only versus primary use? Should any standards apply to an islanded mode? *No. When the interconnection is momentary (as in closed transfers to a backup generator) or the interconnection is not for the purpose of*

delivering energy from the generator to the utility distribution (as in self serve generation), the interconnection requirements may be less rigorous as compared to those of a DG unit intended to export power.

E. Should the same standards apply to new installations versus retrofit of existing self-generators or emergency generators? *Yes*

1. What options should end-users have in terms of choice of interconnection voltage levels, and what are the consequences of these choices? *Rather than focusing on voltage levels, the size of that DG unit compared to the total load on that system is the important issue. An example is a system serving 2MVA of load and a system serving 20 MVA of load. The latter is much more likely to be able to accommodate a 3MVA generator than the former because the system with 20 MVA of load can more easily respond to 3 MVA of distributed generation. Typically, if the generator is less than a given percent of the system's load, then interconnection is straightforward. Further, interconnection at the next higher voltage will usually have a proportionally smaller impact to that system, but increased transformation costs will be incurred.*

2. Are there utility-specific conditions that preclude the application of a single standard? *Yes. The existing distribution system configuration, particularly the location of existing generation and load relative to the DG unit, can have site-specific impacts on the ability of DG units to interconnect to the distribution system. Accordingly, interconnection standards must be sufficiently flexible to account for variables such as the specific DG technology employed, the capacity of the DG unit, and the location-specific impacts of the DG unit on the existing distribution system. In addition, factors such as whether the distribution system is radial (typical) or networked (e.g. major city's downtown) preclude the application of a single interconnection standard in favor of standards that recognize utility-specific conditions. Further, as technologies such as solar do not produce power during the circuit's minimum load period (at night), higher amounts of solar generation can be accommodated on a feeder than other technologies.*

3. The CPUC OIR excludes interconnection rules to the transmission side. Is there any need to revisit this decision? Can it be applied without exceptions? *No. There is no need to revisit the CPUC OIR's exclusion of interconnection rules for the transmission side.*

II. Need for California standards and replacement by national standards

A. Which states have made similar efforts to develop interconnection standards? What is the scope of these efforts? To what extent can the work of other states (e.g., Texas and New York) serve as useful starting points for this effort? *SMUD offers no comment on this question.*

B. What efforts have been made within the state to develop a California consensus on interconnection standards? *SMUD offers no comment on this question.*

C. What is the scope and timing of the IEEE P1547 Distributed Resources Interconnection Standard Working Group? *The IEEE working group expects to produce a standard in 2001*.

D. To what extent do California utilities, manufacturers, and other interested parties participate in the IEEE P1547 Working Group process? How would the development of interim standards in California affect the progress of the IEEE P1547 effort and its representation by California entities? *SMUD believes that the consideration of "interim" interconnection standards is inappropriate. This proceeding should avoid the confusion and delay associated with "interim" standards by proceeding directly to the development of final standards. Only comprehensive, final interconnection standards will promote competitive equal opportunity and reduce transactional uncertainty.*[1]

E. Can interim standards developed in California be considered effectively in the IEEE P1547 effort? *Again, SMUD believes that the consideration of "interim" interconnection standards is inappropriate and that this proceeding should avoid the confusion and delay associated with "interim" standards by proceeding directly to the development of final standards.*

F. How would interim standards be adopted and enforced in California? Should they apply to public utilities as well as the CPUC-regulated utilities? *See SMUD's answer to Question II.D. above.*

G. What are the mechanics for replacing interim California standards with national standards (i.e., IEEE P1547)? *See SMUD's answer to Question II.D. above.*

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[1] SMUD is an interested party to the IEEE P1547 Working Group process. SMUD uses IEEE 929(PV interconnection standard) and recognizes IEEE as an excellent source for technical standards. The development of interim standards in California may draw resources from this states contingent on the IEEE working group. This could result in delaying the issuance of IEEE 1547, reduced representation from this state in the final results, or have no impact depending on the availability of participants.

III. Safety issues

A. What are the major safety issues associated with DG interconnection? *A DG unit that fails to detect a fault, or energizes the distribution circuit during a construction clearance, presents an increased risk of electrocution for both the public and utility workers.*

B. What safety characteristics/protective devices are required of the DG machinery itself? *Fault detection, and Loss of Utility detection (also known as anti islanding) are among the key requirements.*

C. What safety characteristics/protective devices are required for the interconnection device? Is there a need for a disconnect switch in every instance? If not, what criteria triggers the need for a disconnect switch? *Disconnect switches should be applied to all installations. They offer a safety point for utility personnel. While this requirement may seem excessive for small DG's such as roof top PV's, suitable disconnects for these cost less than $100, and are already required as services disconnects by the national electric code for other outdoor appliances such as air conditioners and pool pumps.*

D. What installation testing procedures should be required? Is there a need for periodic retesting? If so, how often and by whom? *SMUD offers no comment on this question at this time.*

IV. Feasibility of type testing

A. Should type testing be incorporated into the interim standards development process? If so, what factors should be considered in the development of standardized testing processes for various DG types? *SMUD offers no comment on this question at this time.*

B. What entity(ies) should certify the equipment? Should self-certification by the equipment manufacturers be allowed? *SMUD offers no comment on this question at this time.*

V. Information and training to be provided to government agencies

A. What information and training should be provided to fire departments and emergency response personnel? *SMUD offers no comment on this question at this time.*

B. What information and training should be provided to local building officials? *SMUD offers no comment on this question at this time.*

C. What information should be provided to air quality districts? *California has numerous air quality districts, each with its own unique requirements. Further, the emission standards within an air quality district can vary widely based upon local ambient air quality. The potential emissions from competing DG technologies also vary widely – all DG technologies are not created equal from an emissions standpoint. Given this uncertainty, the Commission should work cooperatively with the California Air Resources Board and local air district to address potentially significant permitting challenges, including air emission analyses, cumulative impacts, and streamlined permitting to avoid unreasonable delays in deploying environmentally benign DG technologies.*

D. What information should be provided to the CEC under its generator data regulations? (e.g., fuel type, capacity rating, location, etc.) *SMUD offers no comment on this question at this time.*

VI. CPUC Rule 21 changes

A. What changes are needed to Rule 21, (e.g., the elimination of qualifying facility (QF) distinctions?). Are complementary changes to other rules required? *SMUD offers no comment on this question at this time.*

B. What education and training efforts are required in order to process interconnection applications, should they occur in significant numbers? *SMUD offers no comment on this question at this time.*

VII. Advanced communications and metering to facilitate dispatch or scheduling

A. What are the major issues surrounding DG-UDC communications and metering? To what extent can experience with the QF industry provide a useful framework? *In limited situations, effective protective relaying requires communication between the DG relaying and the utilities relaying equipment. This is typically limited to larger DG units relative to the system with which the unit is interconnected, and is usually accomplished with leased phone lines or radio.*

B. What protocols are needed to govern the dispatch of DG facilities? *If a DG unit has contracted with a utility to provide a specific resource, then dispatchability by the utility may be required. In most general cases where the DG provides no specific resource to the utility, no dispatch other than for safety clearances need be required.*

C. What type of hardware or functional requirements should be required? *With the advent of digital relays the distinction of utility grade relays and industrial relays is no longer an issue.*

D. Do larger-sized distributed generation facilities need ISO dispatchability? *Greater than 10MW require ISO dispatch by current tariffs. SMUD does not propose lowering this limit.*

E. Could ancillary functions be accomplished without utility distribution company dispatch? *Ancillary services such as voltage and reactive support cannot be accomplished without utility coordination, as the distribution system has active elements that can act to negate the DG's contribution if not constrained to do otherwise. Ancillary services such as spinning reserves may require much less coordination.*

VIII. Contractual issues surrounding interconnection rules

A. To what extent can interconnection agreements be standardized? In what respects must they be customized? *SMUD believes that the consideration of interconnection standards may be too narrowly focused. Specifically, there may be an assumption that there should be a simple, "one size fits all" approach to interconnection standards. While simplicity is inherently appealing, the assumption that one set of interconnection standards will suffice for all DG technologies is an erroneous assumption. DG units vary widely with respect to the technology employed and the capacity of the DG units. Further, the existing distribution system configuration, particularly the location of existing generation and load relative to the DG unit, can have site-specific impacts on the ability of DG units to interconnect to the distribution system. Thus, interconnection standards must be sufficiently flexible to account for variables such as the specific DG technology employed, the capacity of the DG unit, and the location-specific impacts of the DG unit on the existing distribution system. Consequently, it is unlikely that a single standard interconnection agreement will meet the needs of both utilities and DG owners.*

B. Are there any liability requirements to be included in the agreements? What is the current situation and what is the insurance industry's position? *Questions related to DG unit size and operational characteristics, customer and third-party liability and indemnification arise as part of the two-way power flows associated with DG technologies. Accordingly, the Commission should address the impacts of two-way power flow on distribution system maintenance, planning, and operations as well as the potential liabilities associated with DG. SMUD takes no position as to what liability requirements the Commission and CPUC may impose on investor owned utilities. SMUD does offer that liability provisions for publicly owned*

utilities are appropriately within the jurisdiction of the local governing body of the publicly owned utility.

C. How can non-discriminatory implementation of the rules be maintained and enforced? *SMUD offers no comment on this question at this time.*

IX. Procedural

A. What is the best approach to develop standards in this proceeding? *SMUD supports the working group approach to the development of standards.*

B. Should working groups be formed? If so, how many and how should the work be divided among several working groups? *Again, SMUD supports the working group approach.*

C. How long should it take to develop standards based on the work of other states? *SMUD offers no comment on this question at this time.*

D. Can the schedule for interconnection rules adopted in CPUC R.99-10-025 be satisfied? What process of oversight and facilitation is appropriate to ensure that the schedule is satisfied? *While SMUD applauds the efforts to expedite this proceeding, SMUD believes that the preliminary schedule in this proceeding is extremely ambitious. Major policy issues remain unresolved, and their resolution is unlikely to occur as quickly as set forth in the preliminary schedule. To avoid redundancy, this proceeding must be coordinated with the schedule for the parallel CPUC proceeding to avoid duplication of effort and time delays.*

E. If a working group process cannot provide consensus in the time available, what formal procedures should the Siting Committee employ to provide an opportunity for consideration? *The Commission should continue providing opportunities for public review and comment of interim work products. Further, any Commission sponsored or approved workshop reports or other documents should be issued first in draft form with an opportunity for interested parties to file comments and reply comments.*